

CLAIMS

1. A process for obtaining carbon nanotubes by growth, using the CVD method, on  
5 nanoscale/microscale supports, characterized in that it comprises:
  - the addition of a compound as carbon source containing a catalyst, into a stream of inert gas and hydrogen.
- 10 2. The process as claimed in claim 1, characterized in that it also comprises:
  - the heating, in a reaction chamber, of a nanoscale/microscale ceramic material or of carbon  
15 fibers, to a temperature of 600-1100°C, in a stream of inert gas;
  - the cooling of the chamber down to room temperature; and
  - the recovery of the product formed.
- 20 3. The process as claimed in claim 2, characterized in that the ceramic material is in the form of nanoscale/microscale particles or fibers.
- 25 4. The process as claimed in claim 3, characterized in that the ceramic material is formed from the following: carbon fibers; glass fibers; SiC, TiC, Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub> or B<sub>4</sub>C particles and fibers; silica fume; clays (clay particles); or wires comprising  
30 a metallic material such as Fe, Ni, Co, Ti, Pt, Au, Y, Ru, Rh, Pd, Zr, Cr or Mn.
- 35 5. The process as claimed in any one of claims 1 to 4, characterized in that the compound as carbon source is chosen from the following: liquid hydrocarbons of the group comprising xylene, toluene and benzene; or n-pentane; or alcohols, such as ethanol and methanol; or ketones, such as

5 acetone; or, as a variant, the compound as carbon source is a gaseous hydrocarbon such as acetylene, methane, butane, propylene, ethylene and propene; or the compound as carbon source is solid, such as for example camphor.

10 6. The process as claimed in any one of claims 1 to 5, characterized in that the catalyst is chosen from the group comprising the following: an iron, cobalt or nickel metallocene; or else iron, cobalt or nickel nitrates, acetates or sulfates, especially Fe(II), phthalocyanine (FePc) and iron pentacarbonyl ( $\text{Fe}(\text{CO})_5$ ).

15 7. The process as claimed in any one of claims 1 to 6, characterized in that the catalyst and the compound as carbon source are used in an amount from 0.001 to 0.1 g of catalyst per ml of compound.

20 8. The process as claimed in any one of claims 1 to 7, characterized in that the ratio of inert gas to hydrogen is 5/95 to 50/50.

25 9. The process as claimed in any one of claims 1 to 8, characterized in that, before said step of heating the support material, a silicon-containing compound is used under conditions allowing silicon or a silicon derivative, such as SiC, SiO or  $\text{SiO}_2$ , to be deposited on the surface of the support material.

30 10. The process as claimed in claim 9, characterized in that the silicon-containing compound used is SiO or a silane, such as  $\text{SiCl}_4$ .

35 11. Products thus obtained by the process as claimed in any one of claims 1 to 10, characterized in that they are multiscale composites formed from

carbon nanotubes bonded to nanoscale/microscale carbon fiber or ceramic fiber support materials.

12. Multiscale composites, characterized in that they  
5       comprise carbon nanotubes bonded to  
nanoscale/microscale supports in a polymer, metal  
or ceramic matrix.